

### **REMARKS/ARGUMENTS**

The Office Action dated February 7, 2003 has been carefully reviewed, and these remarks are responsive thereto. Applicants respectfully request reconsideration and allowance of the instant application.

Claims 1-49 remain pending in this application. Original claims 1, 5, 25, and 30 have been amended to recite that the phenol-formaldehyde resins are infinitely water-soluble. Support for this feature can be found, for example, in line 1 of the original abstract (page 39) and in original paragraph 29 (page 14). Claim 28 is amended consistent with its parent claim, claim 25. Claims 2-4, 6-24, 26, 27, 29, and 31-49 remain in their original form. No new matter is included in this Amendment, and no additional claim fees are due as a result of this Amendment.

The Office rejected claims 1-49 under 35 U.S.C. § 102(b) or under 35 U.S.C. § 103(a) based on Higginbottom, U.S. Patent No. 3,956,204 (hereinafter "Higginbottom"). Applicants respectfully traverse this rejection and request its reconsideration.

Higginbottom describes antipunking phenolic resin binder systems useful for producing mineral fiber thermal insulation. The phenolic resins of Higginbottom are prepared in a three-step reaction process. See, for example, the Higginbottom abstract, lines 4-5; column 2, lines 21-24; and column 2, lines 48-50. In the first stage of the reaction process, an acid stage reaction, phenol, formaldehyde, and acid are reacted to form a novolac resin. Id., for example, at column 2, lines 25-27; column 2, line 50 through column 3, line 31; and the Examples (*e.g.*, Example I at column 7, lines 13-17). This acid stage reaction produces a mixture of three methylene bridged dimers, namely, 2,2-dihydroxydiphenylmethane, 2,4'-dihydroxydiphenylmethane, and 4,4'-dihydroxydiphenylmethane. Id. at column 3, lines 5-10. After the acid stage reaction, a resole stage reaction is performed on the novolac resin to produce a resole resin. Id., for example, at column 2, lines 28-32; column 3, lines 32-65; and the Examples (*e.g.*, Example I at column 7, lines 18-25). Then, the resulting resole resin is reacted with a nitrogenous compound to reduce the free formaldehyde content. Id., for example, at column 2, lines 33-38; column 3, line 66 through column 4, line 28; and the Examples (*e.g.*, Example I at column 7, lines 25-30). Applicants respectfully submit that Higginbottom fails to teach or suggest the claimed products and processes.

Higginbottom differs significantly from Applicants' claimed invention in that Higginbottom requires production of a novolac product in an acid stage reaction prior to formation of the resole resin. In contrast, Applicants' invention, as defined in claims 1 and 25, includes "combining phenol, formaldehyde, water, and a base catalyst" to form a mixture, and this mixture is reacted and formaldehyde scavenged to form a resole resin. Thus, Applicants' claimed invention avoids the novolac production process required by the Higginbottom patent. Nothing in Higginbottom teaches or suggests eliminating the novolac production process.

Moreover, by producing the novolac, Higginbottom's resulting phenolic resins differ significantly from the resins produced by the Applicants' process. Applicants advise that resins made using a novolac production process typically have a higher molecular weight and are less water soluble than resins made not using the novolac production process (*e.g.*, because the high dimer content exists in the novolac resins, as noted in Higginbottom). Notably, the Higginbottom resins are not completely water-soluble as are Applicants' claimed resins. Rather, Higginbottom describes that the anti-punk resins produced by his process must be emulsified. See Higginbottom, for example, at column 2, lines 9-20; column 6, line 20 through column 7, line 1, and Examples VI through IX. Emulsifiable resins have significant practical disadvantages in use as compared with water-soluble resins, as described in Applicants' specification, for example, at Paragraphs 11 and 29 (*e.g.*, stickiness). Nothing in Higginbottom teaches or remotely suggests methods of producing infinitely water-soluble, modified phenol-formaldehyde resole resins as recited in Applicants' claims.

Accordingly, in view of the foregoing, Applicants respectfully submit that the present claims patentably distinguish from Higginbottom. Withdrawal of this rejection and allowance of claims 1-49 are earnestly solicited.

### CONCLUSION

Applicants believe that no fee is required for this submission. However, if any fees are required, such as fees under 37 C.F.R. §§ 1.16 or 1.17, or if an extension of time is necessary that is not accounted for in the papers filed with this Amendment, the Commissioner is authorized to

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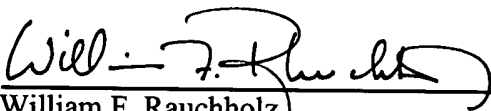
debit our Deposit Account No. 19-0733 for any necessary fees, including any necessary extension fees.

All rejections having been addressed, Applicants respectfully submit that the instant application is in condition for immediate allowance and respectfully solicits prompt notification of the same.

Respectfully submitted,  
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